**Department of Energy**

Washington, DC 20585

June 6, 1997



000102557

Mr Robert G Card
President and CEO
Kaiser-Hill Company, L L C
Rocky Flats Environmental Technology Site
P O Box 464
Golden, CO 80402-0464



EA 97-03

Subject Preliminary Notice of Violation (NTS-RFO-KHLL-ENVOPS-1996-0001)

Dear Mr Card:

This letter refers to the Department of Energy's (DOE) evaluation of noncompliances associated with an increasing trend in the number of criticality safety infractions and an unauthorized movement of six drums in a criticality infringed room of Building 777. These issues were identified by your staff through self-assessment and timely awareness of management to the unauthorized movement. This letter also refers to an incident involving an unplanned dispersal of radioactive material during remediation of trenches T3 and T4.

Noncompliance Tracking System (NTS) reports filed by you concerning the criticality infractions and the drum movement¹ identified several noncompliances with 10 CFR 830.120, "Quality Assurance," pertaining to areas of noncompliance with established contractor programs, procedures and postings, inadequate corrective actions, and insufficient training. Since the NTS reports were filed and during the investigation conducted on February 25-26, 1997, by DOE's Office of Enforcement and Investigation, you provided information on the results of comprehensive root cause evaluations, short term corrective actions taken, and corrective action plans for resolving the underlying causes of these cases. Your proactive approach to identifying and resolving noncompliances associated with the criticality safety infractions meets the discretionary criteria of DOE's Enforcement Policy, and it is concluded that no further enforcement considerations on these matters are necessary.

On October 9, 1996, you also reported to DOE an incident (NTS-RFO-KHLL-ENVOPS-1996-0001) that involved the release of radioactive material during compaction of a radioactively contaminated drum carcass in support of the remediation

¹ NTS-RFO-KHLL-SITEWIDE-1996-0004 and NTS-RFO-KHLL-SOLIDWST-1996-0002.



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of trenches T3 and T4 located in the easterly portion of the Rocky Flats site. The actual work was performed by Rocky Mountain Remediation Services, L L C (RMRS), a subcontractor, at the direction of Kaiser-Hill Company, L.L.C (KHLL). Compaction was performed with a track hoe's bucket and resulted in a release to the ground of approximately 1-2 pounds of depleted uranium. This release was not discovered until several hours later when the track hoe was surveyed upon exiting the exclusion zone. At that time, the spill area was soon identified, the T3/T4 area's radiological controls were then upgraded, the contaminated ground was covered with tarps to prevent any further dispersion of depleted uranium, and the site's Emergency Operation Center was activated to ensure that appropriate personnel and equipment were readily available if needed. A subsequent dose determination using air dispersion modeling and conservative assumptions estimated that onsite and offsite doses were minor.

This release occurred due to the failure by both KHLL and RMRS to recognize the applicability of the radiological control requirements of 10 CFR 835, "Occupational Radiation Protection," when radioactive contamination was identified during characterization of trenches T3 and T4 and the subsequent excavation of soil and debris. In response to this incident you undertook a causal factor analysis and corrective action plan to understand and prevent recurrence of this event. The DOE believes the identification of the noncompliances and the underlying problem of failing to recognize the applicability of 10 CFR 835 to environmental remediation work were disclosed by the response to and investigation of the incident rather than due to any initiative, such as contractor self-assessment, to identify such weaknesses beforehand. The event and conditions constituted inadequate radiological work and contamination control practices, a violation of applicable nuclear safety requirements.

The actual consequences of this incident were small, nonetheless, the violation represents a series of problems that, if they had not been disclosed by this incident and were left uncorrected, could have led to a more serious concern in a subsequent remediation activity involving greater quantities of nuclear material. This issue is sufficiently serious to warrant concern by DOE to ensure that effective actions are taken to preclude a recurrence with potentially more serious consequences. Therefore, in accordance with 10 CFR 820, "Procedural Rules for DOE Nuclear Activities," Appendix A, the violation for the T3 and T4 trenches remediation work has been given a Severity Level III classification.

Since the T3 and T4 trenches incident involved breakdowns by KHLL in its role of providing project integration and oversight, as well as management direction on radiological control programs, and by RMRS in its role of planning, performing, and directly managing the remediation work, DOE has decided to issue a Preliminary Notice of Violation (Notice) to KHLL as well as to RMRS. You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. Your response should document any additional specific

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actions taken to date and planned to prevent recurrence. After reviewing your response to this Notice, DOE will determine whether further action is necessary to ensure compliance with applicable nuclear safety requirements

Sincerely,



Peter N. Brush
Principal Deputy Assistant Secretary
Environment, Safety and Health

CERTIFIED MAIL
RECEIPT REQUESTED

Enclosure
Preliminary Notice of Violation Without Civil Penalty
Investigation Summary Report

cc T O'Toole, EH-1
K. Christopher, EH-10
A. Alm, EM-1
G Podonsky, EH-2
O Pearson, EH-3
S Zobel, EH-10
L Vaughan, EM-10
J Roberson, RFFO
K. Klein, RFFO
P Hartmann, RFFO
H George, EH-10
J Lieberman, NRC
D Thompson, DNFSB
Docket Clerk

**PRELIMINARY NOTICE OF VIOLATION
NTS-RFO--KHLL-ENVOPS-1996-0001**

Kaiser-Hill Company, L L C
Rocky Flats Environmental Technology Site
EA 97-03

During a DOE onsite evaluation conducted on February 25-26, 1997, at the Rocky Flats Environmental Technology Site concerning the environmental remediation of trenches T3 and T4, noncompliances with DOE nuclear safety requirements were identified. These noncompliances are described below in accordance with 10 CFR 820, Appendix A, "General Statement of Enforcement Policy."

- A 10 CFR 835, "Occupational Radiation Protection," Sections 401(a)(2) and (3) require that "[m]onitoring of . . . areas shall be performed to
- (2) document radiological conditions in the workplace, [and]
 - (3) detect changes in radiological conditions "

Contrary to the above, from August 23, 1996, through September 19, 1996, monitoring to document radiological conditions in the workplace and to detect changes in radiological conditions was not performed in that sampling for airborne radioactive material was not conducted during remediation activities for the T3/T4 trenches that were known to contain radioactive materials. Furthermore, air monitoring was not performed on September 19, 1996, during drum carcass compaction activities that resulted in a release of radioactive material to the workplace.

- B 10 CFR 835.404(b) requires that " [a]ppropriate controls shall be maintained and verified which prevent the inadvertent transfer of removable contamination to locations outside of radiological areas under normal conditions "

Contrary to the above, on September 19, 1996, appropriate controls were not maintained or verified to prevent any inadvertent transfer of removable contamination to locations outside of the T3/T4 trench exclusion zone in that, during drum carcass compaction, radioactive material was released from a drum carcass to

the ground where the material remained uncontrolled and exposed to windy conditions for approximately 2 hours

- C 10 CFR 835 603(e) requires that " [for a contamination area] [t]he words 'Caution, Contamination Area' shall be posted where contamination levels exceed values listed in Appendix D of this part, but are less than or equal to 100 times those values "

Contrary to the above, from June 6, 1996, through September 19, 1996, when contamination levels exceeding those values listed in Part 835, Appendix D, were discovered in soil and debris excavated from trenches T3 and T4, posting contaminated trench areas with "Caution, Contamination Area" was not performed.

- D 10 CFR 835 1001(b) requires that " [f]or specific activities where use of physical design features are demonstrated to be impractical, administrative controls and procedural requirements shall be used to maintain radiation exposures As Low As Reasonably Achievable (ALARA) "

Contrary to the above, from June 6, 1996, through September 19, 1996, physical design features were impractical for the T3/T4 remediation work. However, adequate administrative controls and procedural requirements were not implemented to maintain radiological exposures ALARA in that responses to increased levels of radioactive contamination encountered during excavation activities failed to provide a reassessment of work controls associated with waste excavation, segregation, and compaction activities, comprehensive air monitoring downwind of the excavation activities, and a reassessment of radiological area posting requirements to determine if existing trench area postings needed to be updated

Noncompliances A through D collectively constitute a Severity Level III violation

Pursuant to the provisions of 10 CFR Part 820, Kaiser-Hill Company, L.L.C., is hereby required within 30 days of the date of this Notice to submit a written statement or explanation to the Director, Office of Enforcement and Investigation, Attention Office of the Docketing Clerk, EH-10, CXXI, U.S. Department of Energy, 19901 Germantown Road, Germantown, MD 20874-1290, with copies to the Manager, DOE, Rocky Flats Field Office, Mr. Keith Klein, Deputy Manager for Technology Management, DOE Rocky Flats Field Office, and to the Cognizant DOE Secretarial Office for the facility that is the subject of this Notice. This reply should be clearly marked as a "Reply to a Preliminary Notice of Violation" and should include for each violation: (1) admission or denial of the alleged violation, (2) the steps that will be taken to address the corrective

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action issues identified in DOE's Investigation Summary Report for this incident, and
(3) the date when full compliance will be achieved and corrective actions completed

Sincerely,

A handwritten signature in black ink, appearing to read "Peter N. Erush", with a long horizontal flourish extending to the right.

Peter N. Erush
Principal Deputy Assistant Secretary
Environment, Safety and Health

Dated at Germantown, Maryland,
this 6th day of June 1997

OFFICE OF ENFORCEMENT AND INVESTIGATION**WASHINGTON, D.C.****INVESTIGATION SUMMARY REPORT**

**TITLE: SITE-WIDE CRITICALITY SAFETY INFRACTIONS, BUILDING 777 DRUM
MOVEMENT INCIDENT, AND T3/T4 TRENCH REMEDIATION INCIDENT**

**CONTRACTOR: KAISER-HILL COMPANY, L L C
ROCKY MOUNTAIN REMEDIATION SERVICES, L L C**


**NTS NUMBER: NTS-RFO-KHLL-SITEWIDE-1996-0004
NTS-RFO-KHLL-SOLIDWST-1996-0002
NTS-RFO-KHLL-ENVOPS-1996-0001**

DATE: June 6, 1997

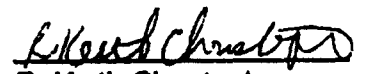
CONTROL OFFICE: EH-1

FACILITY: ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

REPORTED BY:


Steven G Zobel
Team Leader
Office of Enforcement and
Investigation

REVIEWED BY:


R Keith Christopher
Director
Office of Enforcement and
Investigation

INVESTIGATION SUMMARY REPORT

Background

The Rocky Flats Environmental Technology Site (RFETS) is predominantly a DOE-Environmental Management site remediation and waste clean-up activity although storage of approximately 13 metric tons of weapon-grade plutonium is a DOE-Defense Programs responsibility. Kaiser-Hill Company, L.L.C. (KHLL), is the integrating contractor for the operation and clean-up activities at RFETS. Major subcontractors to KHLL are Safe Sites of Colorado, L.L.C. (SSOC) (Westinghouse/B&W), as the major operator of nuclear and radiological facilities at Rocky Flats, Rocky Mountain Remediation Services, L.L.C. (RMRS) (MK-GFerguson/BNFL), for environmental remediation and waste management functions, DYNCORP of Colorado for occurrence investigation; and Wackenhut Services for security.

This investigation reviewed a large number of recent apparent noncompliances with RFETS criticality safety requirements and the apparent noncompliance regarding the dispersal of depleted uranium during remediation of waste disposal trenches T3 and T4. KHLL has entered three separate relevant noncompliance reports into the Noncompliance Tracking System (NTS): a report describing chronic criticality safety infractions (NTS-RFO-KHLL-SITEWIDE-1996-0004) entered on October 1, 1996, a report concerning the unauthorized movement of several drums containing fissile waste materials (NTS-RFO-KHLL-SOLIDWST-1996-0002) entered on December 3, 1996, and a report describing an apparent airborne release of radioactive material during environmental restoration activities (NTS-RFO-KHLL-ENVOPS-1996-0001) entered on October 9, 1996. Each NTS report listed compensatory actions planned and taken along with commitments to conduct root cause analyses and develop corrective actions. The Office of Enforcement and Investigation (EH-10) conducted information gathering and personnel interviews during February 25-26, 1997, at RFETS.

A. Site-Wide Criticality Safety Infractions

Condition/Event Description: NTS-RFO-KHLL-SITEWIDE-1996-0004 briefly described an identified upward trend in the number of criticality safety infractions at the site for the period of July 1, 1995, through September 30, 1996, and that many

criticality safety infractions were long-standing without timely or effective corrective action. Compensatory actions were taken by the contractor for each identified infraction. Identified infractions have included posting violations, less than adequate job controls such as leaving open containers, inadequate analyses of materials and storage areas, and poor housekeeping practices in gloveboxes and other processing areas.

The root cause analysis¹ evaluated 140 infractions that had been entered into a criticality safety infraction database during the period of July 1, 1995, through September 30, 1996. In addition, SSOC conducted numerous walkdowns, initiated a drum movement stand-down, reviewed existing procedures, and interviewed personnel, resulting in additional infractions being identified. KHLL also had an outside, independent assessment performed of the RFETS criticality safety program by criticality experts from Hanford and Savannah River Sites. Results of this assessment and analysis of the data identified the root cause as management failure to achieve an integrated management system of standards and expectations, including teamwork to achieve objectives in a safe and compliant manner. Contributing causes included training, immediate supervision, communications, and procedures.

The corrective action plan² describes actions in several broad areas including correcting criticality safety requirement inadequacies, training, routine work planning and control, quality assessments, corrective actions, and elimination of open container infractions.

Noncompliances: None of the individual criticality infractions represent a potentially significant noncompliance; however, the increasing trend in criticality infractions does reflect a programmatic problem in maintaining compliance with contractor criticality safety requirements. This represents a noncompliance with work process controls intended to assure criticality safety. It was also identified that workers had not received required criticality safety training, and that criticality safety assessments were performed by personnel who had not received adequate criticality safety training.

Additionally, the lack of timely resolution and the failure to institute corrective actions to preclude recurrence of criticality infractions represented a noncompliance with corrective action/quality improvement Quality Assurance program requirements.

Safety Significance: Most of the criticality infractions were noncompliances with procedural controls, and did not represent an immediate criticality threat or a reduction

¹ "Root Cause Analysis CA-96-009 Criticality Safety Infractions" November 19, 1996

² "Criticality Safety Corrective Action Plan - ARB-009-97" January 20, 1997.

in single or double criticality contingencies. Although not an immediate threat for an inadvertent criticality, the frequency and increasing trend were reflective of a negative programmatic deficiency trend toward criticality safety that, if not corrected, could lead to a more serious incident with radiological consequences to workers and the public.

B. Building 777 Drum Movement Incident

Event/Condition Description: On November 26, 1996, six non-criticality-infracted 55-gallon transuranic waste drums were moved from Room 443, a criticality safety-infracted area in Building 777, to a loading dock. The drum movement team entered a storage area and moved drums containing fissile material, contrary to a restriction of the criticality safety infraction posting for the area. The posting stated that fissile material was not to be moved without written guidance from the Criticality Safety organization. It was at this time that the Technical Support Manager tried, unsuccessfully, to speak to the Technical Lead to discuss the Facility Manager's concerns regarding a criticality engineering review; the Technical Support Manager then directed a staff member to locate the Technical Lead. When contact was made by radio, six drums had already been moved. The Facility Manager overheard this conversation and directed the Technical Lead to cease operations. The Shift Manager also overheard the conversation and left a planning meeting to return to Building 777. The Facility Manager directed that all moved drums were to be secured. This evolution was performed without effective work controls and work authorization processes.

A root cause analysis³ and corrective action plan⁴ were completed in accordance with the commitments contained within the NTS report. Several significant deficiencies were noted in the root cause analysis, including the following: (1) poor work scope planning, lack of formal permission processes, and management failure to ensure the evolution was authorized, (2) communications between building landlord (SSOC) and tenant (RMRS) were inadequate, and the landlord-tenant relationship was not formally defined, (3) workers were inadequately selected and supervised, (4) personnel failed to use controlled documents and failed to execute procedures properly, (5) workers were not trained and qualified to perform this evolution, and, (6) personnel failed to display adequate questioning attitudes. The root cause was identified as the failure of organizations and personnel involved to implement adequately the fundamental tenets of conduct of operations. Furthermore, since the drum movement was the third such criticality infraction incident within a four-month period, it was concluded to indicate that the site's process for corrective actions and recurrence control was ineffective.

³ "Root Cause Analysis CA 96-013 Building 777 Drum Movement" February 4, 1997

⁴ "Action Plan 96-002-547" (Draft) February 24, 1997

C. T3/T4 Trench Remediation Incident

Condition/Event Description: During the afternoon of September 19, 1996, T3/T4 trench remediation activities included size reduction (crushing by using the bucket of a track hoe) of certain excavated drum remnants (i.e., carcasses). One carcass released approximately 1-2 pounds of a black powder during the crushing and the powder spread over an area of about 50 feet by 50 feet square. The powder was found to exhibit radioactivity of approximately 4 million disintegrations per minute (using a hand-held survey meter) and was subsequently determined to be depleted uranium. Work was then stopped, RFETS Radiological Engineering was notified, and the site area controls were evaluated and upgraded. Since the potential for an offsite release of radioactive material was apparent due to wind conditions, the Radiological Control Manager activated the Emergency Operations Center in order to obtain immediate and full support for containing the released material.

A root cause analysis,⁵ an evaluation of programmatic issues⁶ identified by the root cause analysis, and a corrective action plan⁷ were developed in accordance with commitments made in NTS-RFO-KHLL-ENVOPS-1996-0001. The root cause analysis focused exclusively on the September 19, 1996, event; however, the programmatic issues evaluation identified fundamental systemic issues and those with generic implications that could impact other site remediation activities. This evaluation identified four causal factors:

- The safety framework did not address all the hazards and adequately support the nuclear aspects of the project (RMRS)
- Management (KHLL, RMRS), oversight (KHLL), and project personnel (RMRS) did not display an adequate questioning attitude to properly address anomalies
- Radiological safety support (KHLL, RMRS) did not provide appropriate technical guidance.
- A nuclear operation safety perspective was not considered as a need in the assembly of the project team (RMRS).

No singular root cause was identified by either the root cause analysis or programmatic issues evaluation.

⁵ "T3/T4 Remediation Radiological Event Causal Factors Analysis" November 22, 1996.

⁶ "Collective Significance Evaluation Report of the Source Removal at Trenches T-3 and T-4 11/20/96"

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- 5 "T3/T4 Remediation Radiological Event Causal Factors Analysis" November 22, 1996
 - 6 "Collective Significance Evaluation Report of the Source Removal at Trenches T-3 and T-4, IHSSs 110 and 111.1" February 3, 1997.
 - 7 "Corrective Actions" contained within "Action Plan Cover Sheet and Signatures" Plan Number 002, February 13, 1997.

UNCLASSIFIED FACSIMILE MESSAGE

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Noncompliances: The failure to adequately assess radiological conditions during remediation activities, to establish radiological areas when the degree of contamination was identified, to post radiological areas, and to monitor for airborne radioactive material constitute noncompliance with current regulations.

Safety Significance: The actual event itself—the release of radioactive material—resulted in no safety significance due to the fact that very little radioactive material could be demonstrated to have dispersed and migrated offsite, and the fact that the material was determined to be depleted uranium instead of a different, more dispersable radioisotope. An initial estimate of worker dose was approximately three millirem but this estimate was later revised downward; offsite dose was much smaller. The determination of no safety significance was due to the low estimated doses that were the result of fortuitousness and not proper work control procedures.

Conclusions for C

Based on a review of the NTS report, root cause analysis, corrective action plan and other relevant documents, it is apparent that in this incident/condition:

- The noncompliance and the underlying problem of inadequate controls to ensure proper radiological steps consistent with 10 CFR 135 are implemented for environmental restoration activities were disclosed by the contractor's investigation of the incident.
- These conditions, if not corrected, could potentially have led to an incident with more significant consequences in other remediation activities.
- The contractor instituted a comprehensive investigation of the incident and its root causes.
- The contractor is implementing comprehensive corrective actions.